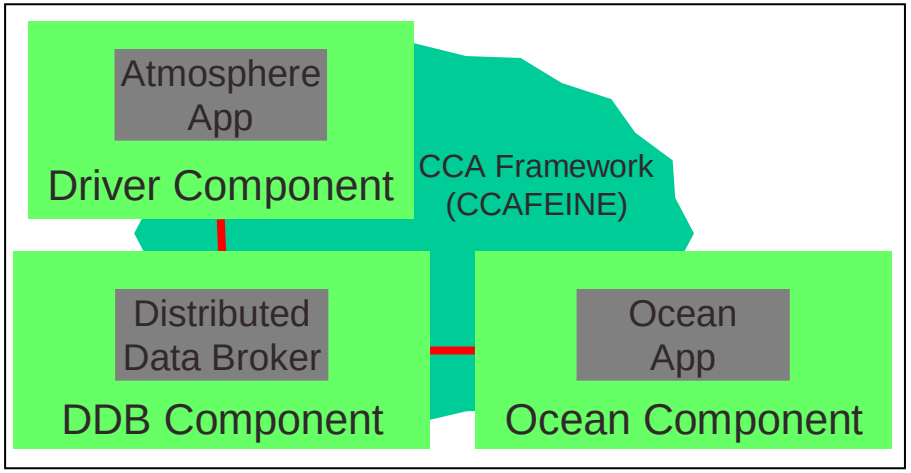
Common Component Architecture Demonstration

PI: Daniel Katz, JPL

Objective

- Examine Common Component Architecture (CCA) for
  - Usability by Earth science modelers
  - Performance Penalties
- CCA:
  - Allows elements of large, complex, parallel applications (called components) to be written by independent groups to a defined interface
  - Standard-compliant components guaranteed to work w/each other and w/standard-compliant frameworks
  - CCA Standard developed by DoE/Academia from 1998



Approach

- Build simple single and dual component applications to study basic CCA overhead and learning curve
- Modernize UCLA coupled climate code for Linux
- Build CCA version of UCLA coupled climate code; measure overhead vs. base application

Key Milestones

• Report on basic sequential CCA application	5/02
• Report on basic parallel CCA application	9/02
• UCLA Data broker + OGCM running on parallel Linux testbed, using MPI	3/03
• Report on CCA version of simplified UCLA climate app.	9/03
• Modernize UCLA climate application and report on CCA version of coupled ocean/atmosphere/data broker application	5/04

Partner: R.Mechoso/UCLA

TRL_{in} =2

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Earth Science Technology Office

Common Component Architecture (CCA) Demonstration

PI: Daniel S. Katz, JPL

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Objective: examine CCA for

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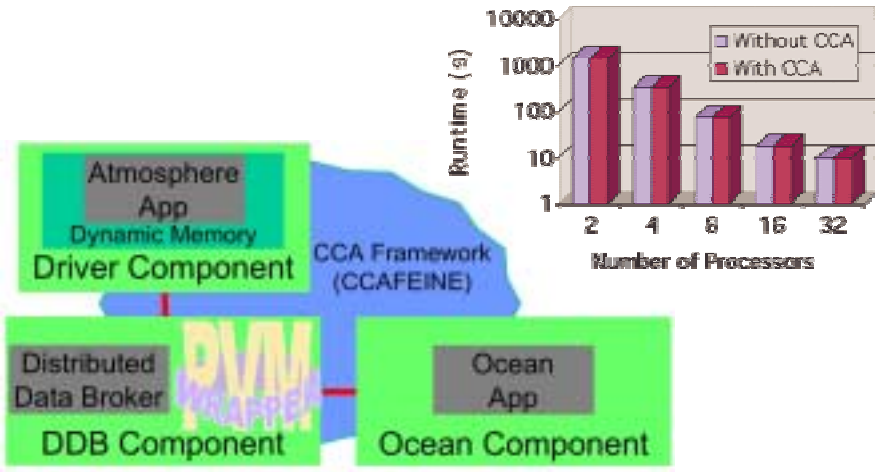

Accomplishments

- Demonstrated componentized sequential and parallel application (driver/AMR library) running with <1% overhead and no adverse affects on scalability with fairly short porting effort.
- Improved UCLA climate model
  - Developed PVM_Wrapper software (released through Open Channel Foundation) to permit use of MPI in model
  - Ported Atmospheric Model to use modern Fortran90 dynamic memory in place of previous vendor-specific solutions
- Demonstrated componentized version of UCLA climate model running with <5% overhead
- Participated in 10 CCA quarterly meetings to ensure planning for CCA included NASA considerations, including hosting 1 CCA meeting co-located with ESTO CT PI meeting to promote CCA/CT understanding and collaboration
- Participated in presenting 6 CCA tutorials to ensure reasonable learning curve for new CCA users, including 1 tutorial for ESTO CT PIs.

Collaborators: C. Roberto Mechoso/UCLA, Craig D. Miller/JPL, Charles D. Norton/JPL, Joseph Spahr/UCLA, E. Robert Tisdale/JPL

TRL_{in} =2; TRL_{out}=4

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